



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,227	04/08/2004	Joannes Theodoor De Smit	081468-0309173	6925

909 7590 02/24/2006

PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA 22102

EXAMINER

MATHEWS, ALAN A

ART UNIT PAPER NUMBER

2851

DATE MAILED: 02/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/820,227	Applicant(s) DE SMIT ET AL.	
	Examiner Alan A. Mathews	Art Unit 2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-11,14-16 and 20-24 is/are rejected.
- 7) ☒ Claim(s) 3,4,12,13 and 17-19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4/8/04 & 5/14/04</u> * <u>11/2/04 & 2/22/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Upon very, very careful consideration of Applicant's arguments, the Examiner withdraws the restriction requirement set forth in the previous office action.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 5, 7, 8, 10, and 20-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Levinson (U. S. Patent Application Publication No. 2005/0037269 A1). Figures 1 and 2 and page 2, paragraphs # 14 - # 22, disclose a radiation system 14, a support structure for patterning means (mask) 18, a substrate table for substrate 12, and a projection system 20. A liquid supply system includes element 32 (paragraph # 19) for supplying a liquid 24 (see paragraph # 16) between the final element 36 of the projection system and the substrate 12. Page

Art Unit: 2851

3, paragraph # 32, recites “Example correction actions can include sending commands to the immersion medium control subsystem 32, such as commands to decrease or increase an immersion medium 24 flow rate, to increase the pressure of the immersion medium (**e.g. in an attempt to force out or dissolve the foreign body 28**), and so forth.” This is a foreign body 28 removal means. And paragraph # 13 discloses that foreign body 28 can be a bubble. Thus, Levinson discloses that the liquid supply system comprises a bubble reduction means or removal means. With respect to claim 2, page 2, paragraph # 22, and figure 2, disclose detector means 44 for detecting a foreign body (bubble) 28. With respect to claim 7, in paragraph # 32 states “commands to decrease or increase an immersion medium 24 flow rate”, which would be a bubble removal means by providing a continuous flow of liquid over the final element 36. With respect to claim 8, paragraph # 32 states “to increase the pressure of the immersion medium 24”, which would be to pressurize the liquid. With respect to claim 20, pages 2 and 3, paragraph # 22 - # 30, and figure 2, disclose a detector including a light source 42 and a comparator (paragraph # 26 and 27). Paragraph # 26 states “(**e.g. having a location that is different than expected and/or an intensity that is less than expected**)”. This can only be done by comparison. With respect to claim 21, paragraph # 13 and # 18 disclose that foreign bodies (element 28) can include particles of dust, a contaminant, stray piece of resist, or a bubble. With respect to claim 24, paragraph # 29 disclose **deferring exposure** when there is identification of a foreign body. Paragraph # 32 further discloses alerting the operator or waiting a predetermined period of time and taking a corrective action upon detection of a foreign body 28.

Art Unit: 2851

4. Claims 1, 2, 5, 10, 14, and 20 and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Pawloski et al. (U. S. Patent No. 2005/0048223) A1. Figures 1 and 2 and pages 2 and 3, paragraphs # 22 - # 30, disclose a radiation system 14, a support structure for patterning means (mask) 18, a substrate table for substrate 12, and a projection system 20. A liquid supply system includes element 32 (paragraph # 19) for supplying a liquid 24 (see paragraph # 29) between the final element 36 of the projection system and the substrate 12. Paragraph # 29 and # 40 and figure 2 further disclose a bubble reduction means 34 which outputs an ultrasonic wave 36 to interact with and disrupt and/or **dissipate the bubble 28** which is located in a volume 38 of the immersion medium. With respect to claim 2, paragraph # 28 discloses that the bubble reduction means could include a bubble detection means. It is noted that the related application referred to in paragraph # 29, which discloses the details of the detection means, has the exact same title as the U. S. Patent Application Publication No. 2005/0037269 A1 used in the rejection above. With respect to claim 10, paragraph # 26 discloses the liquid 24 being between the photoresist and the lens. With respect to claim 14, paragraph # 33 and # 36 discloses moving particles left to right by the ultrasonic waves which move from left to right. With respect to claim 20, paragraph # 44 discloses comparing information obtained from laser beams (light source). Such information may be based on diminishment of the laser beam or by the presence of scattered light produced when the laser beam is incident upon the bubble 28.

5. Claims 1, 5, 6, 10, 11, 16, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi (U. S. Patent No. 5,610,683, cited on Applicant's PTO-1449 filed May 14, 2004). Takahashi '683 is a family member of EP 0 605 103 A1 cited as an X reference in a Search

Art Unit: 2851

Report submitted by Applicant in an IDS. Figures 1 and 2 disclose a lithographic projection apparatus with a radiation system 3, a support structure 5 for supporting patterning means (reticule) 1, and a substrate table 9 for holding substrate 2. A liquid supply system for filling a space between the final element 7 of the projection system and the substrate with liquid 23 includes elements, 19, 20, 21, and 25-3. The liquid supply system includes element 22 which is a bubble reduction means (see column 6, lines 38-42, column 7, lines 30-33, column 8, lines 7-10, and column 9, lines 12-20). With respect to claim 5, column 7, lines 30-35, discloses removing bubbles. With respect to claims 6 and 11, column 9, lines 9-12 disclose a vacuum pump 24 coupled to a portion adjacent the top of the cassette. With respect to claim 10, column 7, lines 50-55, disclose removing the bubbles before the cassette is loaded in the exposure apparatus. With respect to claim 16, column 6, lines 32-35, disclose controlling the temperature of the liquid.

Claim Rejections - 35 USC § 103

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Levinson (U. S. Patent Application Publication No. 2005/0037269 A1) as applied to claim 1 above, and further in view of the Japanese Patent document 10-303114 (cited on Applicant's PTO-1449 filed May 14, 2004). Levinson discloses the invention except for disclosing wherein the composition of the liquid is chosen to have a lower surface tension than water. The Japanese Patent document 10-303114 discloses in the Abstract putting an additive in the liquid used in immersion lithography which **reduces the surface tension of pure water**. It would have been obvious at the time the

Art Unit: 2851

invention was made to a person having ordinary skill in the art to provide Levinson with liquid having a lower surface tension than water in view of the Japanese Patent document 10-303114 for the purpose of improving the properties of the liquid and thus producing a better final product.

7. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Levinson (U. S. Patent Application Publication No. 2005/0037269 A1) as applied to claim 5 above, and further in view of Dulneveld et al. (U. S. Patent Application Publication No. 2005/0174549 A1). Levinson discloses the invention except for disclosing an electric field generator for dislodging bubbles. Dulneveld et al. discloses in figures 4 and 5 using an electric field to dislodge bubbles. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide Levinson with an electric field generator to dislodge bubbles in view of Dulneveld et al. (U. S. Patent Application Publication No. 2005/0174549 A1). The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor

Art Unit: 2851

under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c).

This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Allowable Subject Matter

8. Claims 3, 4, 12, 13, 17-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The reasons for the indicated allowability of the claims are as follows:

The prior art does not disclose or suggest wherein said bubble detection means comprise at least one ultrasonic transducer, the attenuation of ultrasonic waves in said liquid being measured by said transducer so as to obtain information about bubbles present in said liquid in combination with all the other elements recited in the parent claims to dependent claim 3.

The prior art does not disclose or suggest wherein said selective heater comprises a microwave source in combination with all the other elements recited in the parent claims to dependent claim 17.

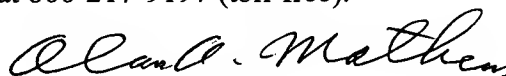
Art Unit: 2851

The prior art does not disclose or suggest wherein said bubble removal means comprises a particle input device for introducing particles into said liquid, and a particle removal device for removing said particles from said liquid in combination with all the other elements recited in the parent claims to dependent claim 18.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan A. Mathews whose telephone number is (571) 272-2123. The examiner can normally be reached on Monday through Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on (571) 272-2258. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Alan A. Mathews
Primary Examiner
Art Unit 2851

AM